

10/564043



IAP20 Res'd PCT/PTD 09 JAN 2006

European Patent Attorneys
European Trade Mark Attorneys
European Design Attorneys

Bavariaring 11
D-80336 München

Telefon: + 49-89-21 99 12 0
Telefax: + 49-89-21 99 12 20
E-mail: maximark@propat.de

MÜLLER SCHUPFNER

P A T E N T A N W Ä L T E

Mandataires en brevets européens
Conseils européens en marques
Conseils européens en dessins ou modèles

P R O P A T[®]

International Patent Application PCT/EP2004/005610

Ferton Holding S.A.

11368.9 PT-WO RH/Fi

New Claims

1. A Nozzle piece for a dental powder jet apparatus adapted for an exchangeable assembly on a hand piece and having a discharge nozzle for discharging a mixture of air and a dental powder suitable for cleaning piece, as well as a discharge nozzle for a fluid, wherein a front partial length at the outlet cross section of the discharge nozzle projects over a grip (1) of the nozzle piece (2) connected to the hand piece, and wherein the front partial length is formed as a tube (7, 7', 7'', 7''', 8) and is provided with nozzle openings (9, 10, 10', 10'', 11, 12', 13, 17) in the lateral area of the front end of the tube (7, 7', 7'', 7''', 8), wherein the mouth of the discharge nozzle for the fluid is axially displaced backwards with respect to the discharge nozzle (18, 19) for the air-powder-mixture,

characterized in that

the nozzle opening (9, 10, 10', 10'', 11, 12, 12', 13, 17) for the air-powder-mixture and the discharge nozzle (18, 18', 19) for the fluid have such dimensions and are disposed such that an eddy or vortex formation is promoted inside the treated (sub-gingival) gum pocket.

.../2

2. The nozzle piece of claim 1,

characterized in that

the nozzle openings (9, 11, 12, 12') are arranged in a common radial plane of the tube (7, 7', 7'', 7''') and are spaced in regular distances or in varying distances along the corresponding circumference of the tube.

3. The nozzle piece of claim 1,

characterized in that

the nozzle openings (9) are arranged in at least two different radial planes of the tube (7'') and in that the nozzle openings in one radial plane are twisted with respect to the nozzle openings in the other radial plane in the circumferential direction of the tube.

4. The nozzle piece according to one of claims 1 - 3,

characterized in that

the nozzle openings (9) are formed as radial passages.

5. The nozzle piece according to one of claims 1 - 4,

characterized in that

the nozzle openings (11) are formed as beveled passages, forming an acute angle with the axis of the tube (7''').

6. The nozzle piece according to one of claims 1 - 4,

characterized in that

the nozzle openings (12, 12') are formed as tangentially oriented or skewed passages.

7. The nozzle piece of claim 6,

characterized in that

the axes of the tangential or skewed passages (12') are oriented in an acute angle to the axial plane of a tube (7).

8. The nozzle piece according to claim 5 or 6,

characterized in that

the outlet cross sections of the beveled passages and/or the tangential or skewed passages (12, 12') are disposed downstream of the corresponding inlet cross sections of the passages.

9. The nozzle piece of claim 6,

characterized in that

the axes of the tangential or skewed passages (12, 12') run in a common radial plane of a tube (7).

10. The nozzle piece of one of claim 1 - 9,

characterized in that

the nozzle openings (17) are elongated or slot-shaped.

11. The nozzle piece according to claim 10,

characterized in that

a defined longitudinal axis of the slot-shaped nozzle openings (17) is parallel to the main axis of the tube or forms an angle to a lateral area of the tube.

12. The nozzle piece according to one of claims 1 - 11,

characterized in that

in one or each of the radial planes of the tube (7, 7', 7'', 7''') at least three nozzle openings (9, 11, 12, 12') are disposed along the corresponding circumference of the tube.

13. The nozzle piece according to one of claims 1 - 12,

characterized in that

the front end of the tube (7, 7'') is either closed or provided with an axial nozzle opening (10).

14. The nozzle piece according to claim 13,

characterized in that

the axial nozzle opening (10'') is diffuser-shaped.

15. The nozzle piece according to claim 13,

characterized in that

the axial nozzle opening (10) is shaped in the style of a venturi nozzle (13).

16. The nozzle piece of claim 13,

characterized in that

the axial nozzle opening (10) is provided with an outlet cross section (10') which narrows in the axial direction.

17. The nozzle piece of claim 13,

characterized in that

the axial nozzle opening (10) is asymmetrically formed in order to deflect the discharged air-powder-mixture jet from the axis of the tube.

18. The nozzle piece of one of claims 13 - 16,

characterized in that

a deflection body (15, 16) is provided at the axial nozzle opening (10), the deflection body directing the discharged air-powder-mixture jet against the treated tooth surface.

19. The nozzle piece according to claim 18,

characterized in that

the deflection body (16) is interchangeably mounted on the tube (7).

20. The nozzle piece according to one of the preceding claims, **characterized in that**, the fluid discharge nozzle (18) is concentrically arranged to the discharge nozzle for the air-powder-mixture.

21. The nozzle piece according to one of the preceding claims, **characterized in that** the fluid discharge nozzle (18') is provided with a diffuser-shaped outlet cross section.

22. The nozzle piece according to claim 21, **characterized in that** the fluid discharge nozzle (19) is disposed on one side of the discharge nozzle for the air-powder-mixture.

23. The nozzle piece according to one of claims 1 - 22, **characterized in that** the tube-shaped partial length (8) of the nozzle piece (2) has an arched shape ending at the nozzle openings of the discharge nozzle.

24. The nozzle piece according to one of claims 1 - 23, **characterized in that** the tube-shaped partial length (8) of the nozzle piece (2) has an oval to elliptic cross section.

25. The nozzle piece according to one of claims 1 - 24, **characterized in that**

the tube-shaped partial length (7, 7', 7'', 7''', 8) of the nozzle piece (2) is made of a material behaving atraumatically regarding its hardness and surface texture, in particular of polycarbonate or another plastic.

26. The nozzle piece according to one of claims 1 - 25,
characterized in that

a scale (20) and/or a color partitioning for marking the position of the nozzle openings relative to the main axis of the hand piece is provided on the tube-shaped partial length (7, 7', 7'', 7''', 8) of the nozzle piece (2).

27. The nozzle piece according to one of claims 1 - 26,
characterized in that

the tube (7) is composed of a single-use product exchangeably mounted on the grip (1).

28. The nozzle piece according to one of claims 1 - 28,
characterized in that

the tube (7) is held by a holding piece (21) which is rotatable relative to the grip (1).